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A New Land Tortoise, *Testudo riggsi*, from the Middle Pliocene of Seward County, Kansas

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ABSTRACT: A new small land tortoise, *Testudo riggsi* sp. nov., is described from a middle Pliocene deposit in Seward county, Kansas. It constitutes a part of the local Saw Rock Canyon fauna.

INTRODUCTION

IN June, 1943, while engaged in coöperative geological work in Seward county, Kansas, with Doctor Thad McLaughlin, of the United States Geological Survey, we discovered fossil remains of two specimens of a small turtle. While turtle remains are probably as numerous as the remains of any other vertebrate in the Pliocene and Pleistocene of Kansas, they are as a rule broken and disarticulated so that only fragmentary parts of an individual are ever recovered. These fragments seldom warrant collecting since only rarely are they identifiable. However, the finding of these two specimens and their associated fragments gave promise to the securing of nearly complete individuals. The surrounding areas were carefully searched for all pieces of each individual. The associated parts of the carapace and plastron of each individual when found were disarticulated at the sutures and greatly fractured along the deep sulci which were present where the scutes meet, thus producing a thin structure in the heavily developed carapace. In the laboratory with tedious efforts the shells were pieced together. The restored carapace is slightly warped. Due to the broadly arched carapace the peripheral bones are nearly hidden from the dorsal view. I am greatly indebted* to Mr. Elmer S. Riggs, Honorary

* I wish to express my gratitude to Doctor E. H. Taylor for numerous helpful suggestions and criticism in the course of the study of these specimens.

Curator of Vertebrate Paleontology, who has generously given his time for the past year in helping with Museum and Field Work and especially for his painstaking labor in helping me in the reconstruction of the two specimens here reported. The species is named in his honor.

Testudo riggsi sp. nov.

Holotype. Kansas University Museum of Vertebrate Paleontology, No. 6789, a nearly complete carapace and plastron, of an adult turtle, showing 14 lines of growth. *Paratype,* No. 6790, complete plastron and nearly complete carapace, and parts of skeletal elements of an adult with 16 lines of growth.

Horizon and type locality. Middle Pliocene, Locality No. 6, Seward county, Kansas. Saw Rock Canyon fauna.

Diagnosis. Probably the smallest of the known fossil species of *Testudo* from North America; superficially resembling *Gopherus berlandieri* (Agassiz), being of about the same size, although possessing a much heavier carapace and plastron that are rugose in appearance due to lines of growth: gular portion of the epiplastron decidedly thicker; distinguished from known species of *Testudo* by its small size and the high broadly arched carapace.

Description of type. A land tortoise with a carapace length of 176 mm.; carapace width of 155 mm. or 82 percent of its length. The height of the carapace is 85 mm., or 48 percent of its greatest length. Greatest length of the plastron is 189 mm., and the greatest width is 140 mm. The scale and bone formulae of the carapace and plastron are as follows: Scutes: 1 nuchal, 5 vertebral, 1 pygal, 4 costals, 11 marginals, 1 gular, 1 humeral, 1 pectoral, 1 axillary, 1 abdominal, 1 inguinal, 1 femoral, 1 anal. Bones: 1 nuchal, 8 neurals, 1 suprapygal, 1 pygal, 8 costals, 11 peripherals, 1 epiplastron, 1 entoplastron, 1 hyoplastral, 1 hypoplastral, 1 xiphiplastron.

The carapace is decidedly convex with the lip or gular lobes projecting well in front of anterior margin of the carapace. The nuchal scute is well developed. The surface of the bone of the first costal scute on the right side has fourteen concentric lines of growth, which are deep and well formed. The fifth costal bone is rectangular in shape, being as wide at the distal end as at the proximal end. The seventh costal bone has a width of 22.8 mm. at the distal end as compared to a width of 12.6 mm. at the proximal end. There is only one suprapygal bone although it is broken where it joins the eighth neural bone and the suture is destroyed. The suprapygal

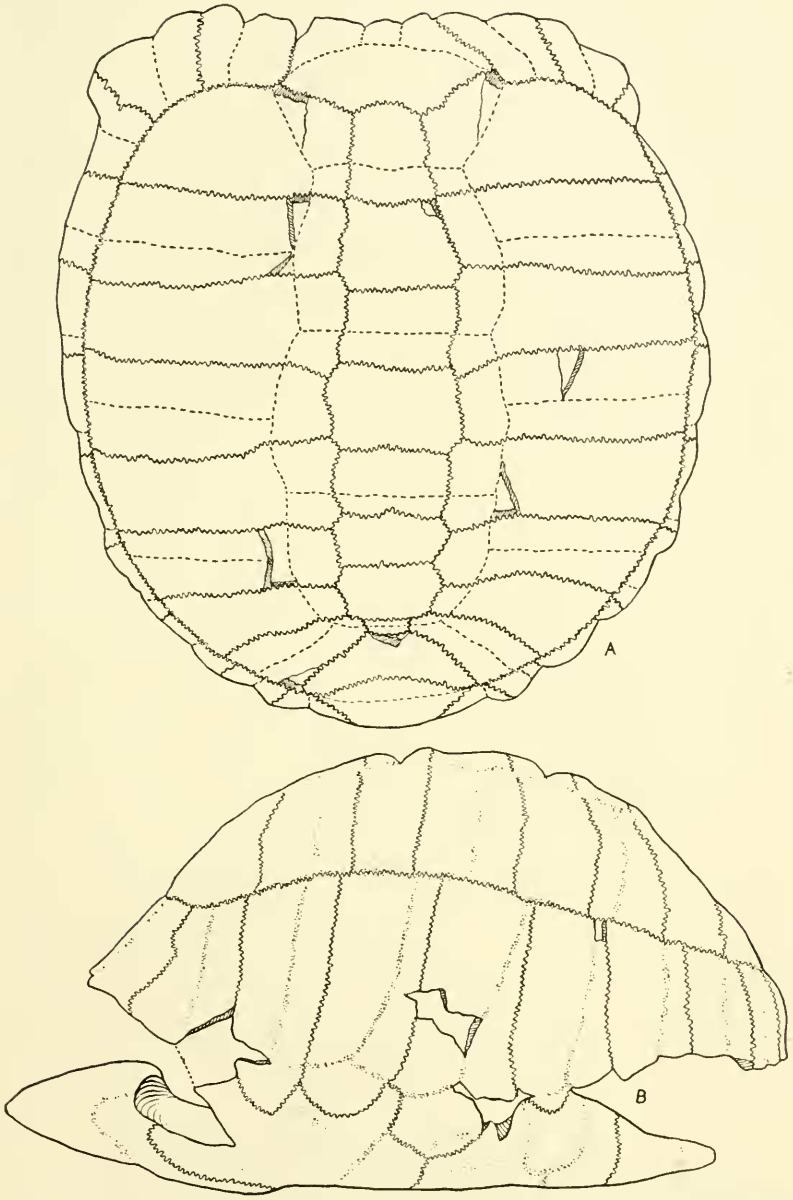

FIG. 1. *Testudo riggsi*, sp. nov. Type No. 6789, Kansas University Museum of Vertebrate Paleontology, Middle Pliocene Seward county, Kansas. A, dorsal view. B, lateral view. Drawings by Miss Barbara Barto.

is concave along its posterior border and joins the pygal bone which is convex anteriorly. The sulcus of the fifth vertebral scute crosses well down on the pygal bone. This region is similar to that figured by Hay[1] (1908, p. 429, fig. 561.) in *Testudo osborniana* Hay, specimen No. 5871 A. M. N. H. The free margin of the pygal bone is 9.5 mm. wide forming a slight indention in relationship to the adjoining free ends of the peripheral bones. The free borders of the peripherals are deeply notched and obtuse posteriorly, the greatest thickness being 16.5 mm. The greatest thickness of the anterior peripherals is 23.0 mm. The inguinal buttress extends but slightly above the costo-peripheral sature, though it is further expressed by a ridge on the inner surface of the sixth costal bone, extending approximately three-fourth of the distance along the midline of its inner surface. The ribs and vertebrae are missing.

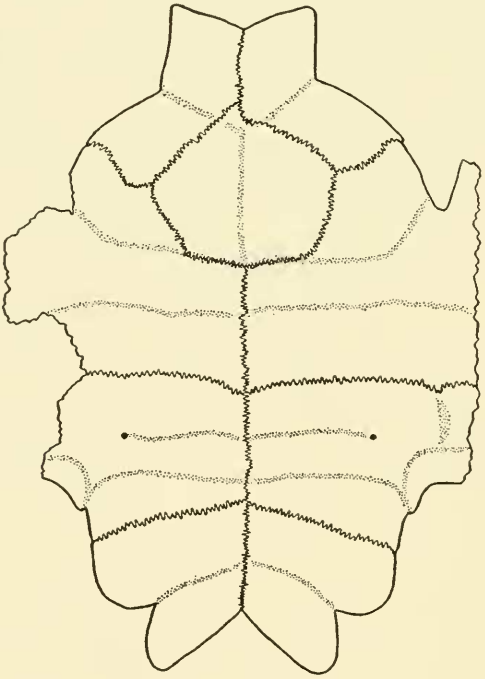

FIG. 2. *Testudo riggsi.* sp. nov. Ventral view of plastron of type No. 6789, Kansas University Museum of Vertebrate Paleontology. Drawing by Miss Barbara Barto.

1. Hay, O. P. 1908, The Fossil Turtles of North America, Carnegie Institution of Washington. Publ. No. 75, 568 pp, 113 pls., 794 figs.

Measurements of type and paratype

	Type mm.	Paratype mm.
Total length of carapace	176.0	185.0
Greatest width of carapace	155.0	165.0
Greatest height of carapace	85.0	———
Length of bridge	81.5	85.0
Anteroposterior length of nuchal bones	37.1	42.5
Greatest width of nuchal bones	47.9	46.8
First neural bone (greatest length and width)	25.4–20.2	———
Second neural bone (greatest length and width)	20.9–26.6	———
Third neural bone (greatest length and width)	17.0–24.8	———
Fourth neural bone (greatest length and width)	19.5–28.8	———
Fifth neural bone (greatest length and width)	16.1–25.2	———
Sixth neural bone (greatest length and width)	15.2–27.5	———
Seventh neural bone (greatest length and width)	15.8–23.6	———
Eighth neural bone (greatest length and width)	11.4?–10.2	———
Suprapygal bone (greatest length and width)	34.0–42.6	———
Pygal bone (greatest length and width)	28.2–41.0	———
First costal bones (greatest length and width)	58.0–32.3	58.3–35.5
Second costal bones (greatest length and width)	62.0–24.0	———
Third costal bones (greatest length and width)	68.0–19.3	———
Fourth costal bones (greatest length and width)	67.8–23.6	———
Fifth costal bones (greatest length and width)	70.5–19.3	———
Sixth costal bones (greatest length and width)	59.0–19.6	———
Seventh costal bones (greatest length and width)	56.4–21.8	———
Eighth costal bones (greatest length and width)	36.3–16.0	———
First marginal bone (greatest length and width)	27.5–23.8	———
Second marginal bone (greatest length and width)	29.7–29.9	———
Third marginal bone (greatest length and width)	32.3–24.2	———
Fourth marginal bone (greatest length and width)	——23.4	———
Fifth marginal bone (greatest length and width)	———	———
Sixth marginal bone (greatest length and width)	———	———
Seventh marginal bone (greatest length and width)	44.9–23.8	———
Eighth marginal bone (greatest length and width)	37.9–22.0	———
Ninth marginal bone (greatest length and width)	27.0–23.5	———
Tenth marginal bone (greatest length and width)	32.0–20.0	———
Eleventh marginal bone (greatest length and width)	27.0–23.1	———
First vertebral scute (greatest length and width)	41.8–51.0	———
Second vertebral scute (greatest length and width)	35.5–46.5	———
Third vertebral scute (greatest length and width)	36.8–51.9	———
Fourth vertebral scute (greatest length and width)	37.0–46.5	———
Fifth vertebral scute (greatest length and width)	36.9–54.5	———
First costal scute (greatest length and width)	50.4–44.5	51.9–48.5
Second costal scute (greatest length and width)	56.5–37.3	———
Third costal scute (greatest length and width)	56.3–37.0	———
Fourth costal scute (greatest length and width)	45.5–42.5	———
Greatest length of plastron	189.0	195.0
Length of plastron in midline	162.0	173.0
Width of plastron at axilla	105.0	105.0
Width of plastron at inguinal border	90.0	100.0
Length of free lateral margin of gular bone	22.0	25.0
Width of base of both gular lobes	41.5	43.5
Greatest thickness of gular lobes	27.4	29.7
Width of emargination of anterior gular lobes	36.0	17.0
Depth of emargination of anterior gular lobes	6.4	3.5
Greatest anteroposterior length of entoplastron	45.2	44.0
Greatest width of entoplastron	48.0	42.3
Greatest anteroposterior length of hyoplastral	65.4	68.1
Greatest width of hyoplastral	72.2	69.2
Greatest anteroposterior length of hypoplastral	51.3	57.5
Greatest width of hypoplastral	66.3	68.2
Width of xiphiplastron on anterior suture	44.6	49.3

	Type mm. Type	Paratype mm. Paratype
Length of xiphiplastron on median suture	30.5	29.6
Width of emargination of anal lobes	39.0	42.8
Depth of emargination of anal lobes	16.0	22.0
Greatest thickness of anal lobes	10.4	11.5

The paratype agrees with the type, except that it is slightly larger. There are other slight differences between the two specimens which may be individual variation, but which I have considered as sex differences. The type appears to be a male with the entoplastron thicker and flatter and a well-developed prominence posteriorly where the entoplastron joins the pectoral sulcus. The gular lobes or the lip are not as flared nor the emargination as deep as in the type. The paratype has a wider and deeper emargination in the xiphiplastron with the free edges thinner than in the type. The pits where the ischia rests on the xiphiplastron are relatively shallower. A few skeletal elements were recovered with the paratype although only the femurs are complete. These have an overall length of 54.9 mm.

Remarks. Although the skull is unknown the species has been assigned to the genus *Testudo* rather than to the genus *Gopherus* for the following reasons. (1) The bones of the carapace and plastron are deeply sculptured by lines of growth, a condition unknown in *Gopherus*. (2) The carapace and plastron are very thick in comparison with those of *Gopherus*. (3) The peripheral bones are obtuse and deeply grooved by the sulci of the scales and much thicker than those observed in *Gopherus*. (4) The costal bones are equally as wide or wider distally, than proximally, while in specimens of *Gopherus* examined (*G. agassizii* (Cooper) and *G. berlandieri*) the fifth and seventh costal bones are considerably narrowed distally and are tapering instead of rectangular in shape. (5) Only one suprapygal is present which is concave at the distal end instead of two which occur in *Gopherus*, the second being convex distally. The pygal in the fossil species is convex at the proximal end and extends well above the costo-peripheral sulcus while in *Gopherus* the pygal extends to the costo-peripheral sulcus.

Associated forms found in the deposit with *Testudo riggsi* were the specimens of *Pliomastodon adamsi* Hibbard, *Osteoborus progressus* Hibbard, numerous beaver teeth of the genus *Dipoides*,[2] and abundant mollusks. The associated invertebrates and vertebrates from this locality are designated as the Saw Rock Canyon (local) fauna.

2. The beaver teeth were sent to Doctor R. A. Stirton, Curator of Vertebrate Paleontology, University of California, for verification. In a letter of August 6, 1943, he writes, "The specimens from Seward county, Kansas, seem to be clearly referable to the *sigmodus-williamsi* group of the genus *Dipoides*. This animal appears to be a well advanced Middle Pliocene form."